

**WHAT IS CLAIMED IS:**

1. A control chip capable of updating data in a non-volatile memory in an optical disk drive, the control chip comprising:
  - a microprocessor for controlling actions of the optical disk drive;
  - 5 a decoder controlled by the microprocessor and connected to an external buffer memory and a host interface;
  - a controller controlled by the microprocessor and connected to the decoder for receiving a control signal and data from the optical disk drive;
  - an extra memory connected to the microprocessor for receiving an update
  - 10 program routine or normal data of the microprocessor;
  - a DMA unit controlled by the microprocessor for reading the data from the external buffer memory; and
  - a macro unit controlled by the microprocessor for receiving data output from the DMA unit and writing the data into a non-volatile memory;
  - 15 wherein, when the control chip updates the data in the non-volatile memory, the extra memory serves as a buffer memory for the update program routine of the microprocessor, and the microprocessor outputs the control signal to the DMA unit and the macro unit, and the data in the buffer memory is written into the non-volatile memory using the
  - 20 macro unit and the DMA unit in a hardware manner.
2. The control chip according to claim 1, wherein the non-volatile memory is a flash memory.
3. The control chip according to claim 1, wherein when the control chip

updates data in the non-volatile memory, the microprocessor outputs a start position and a data length in the buffer memory to the DMA unit.

4. The control chip according to claim 3, wherein when the control chip updates data in the non-volatile memory, the microprocessor outputs a start  
5 writing signal and a stop writing signal to the macro unit.
5. The control chip according to claim 4, wherein when the control chip updates data in the non-volatile memory, the microprocessor receives an interior state signal of the macro unit to monitor actions of the macro unit.
6. A method for updating firmware of an optical disk drive, which is writing  
10 to-be-updated firmware from a buffer memory to a non-volatile memory through a macro unit and a DMA unit, the method comprising the steps of:  
loading an update program routine into an extra memory so as to enable a  
microprocessor to execute the update program routine in the extra  
memory when an update action is performed;  
15 loading program codes, in which the to-be-updated firmware is loaded into  
the buffer memory;  
setting the DMA unit and the macro unit, in which the microprocessor  
computes a start position of the firmware stored in the buffer memory  
and a length of the firmware, the start position and the length are  
20 output to the DMA unit, and a start address of the non-volatile  
memory is set in the macro unit;  
writing the program codes, in which the microprocessor generates and  
outputs an initialization signal to the macro unit and the DMA unit so

as to enable the DMA unit to read data from the buffer memory and transfer the data to the macro unit, which writes the data into the non-volatile memory; and

stopping the update action, in which when the data have been written

5 completely, the microprocessor generates a stop signal to the macro unit and the DMA unit, so as to stop actions of the macro unit and the DMA unit and switch to a normal operation mode.

7. The method according to claim 6, further comprising a step of monitoring an interior state of the macro unit by the microprocessor.

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